AWK-3121
Quick Installation Guide

Moxa AirWorks

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P/N: 1802031210013

Overview

Moxa's AWK-3121 Access Point/Bridge/AP Client is ideal for applications that are hard to wire, too expensive to wire, or use mobile equipment that connects over a TCP/IP network. The AWK-3121 is rated to operate at temperatures ranging from 0 to 60°C for standard models and -40 to 75°C for extended temperature models, and is rugged enough for any harsh industrial environment. Installation is easy, with either DIN-Rail mounting or distribution boxes. The DIN-Rail mounting ability, wide operating temperature range, and IP30 housing with LED indicators make the AWK-3121 a convenient yet reliable solution for any industrial wireless application.

Package Checklist

Moxa's AWK-3121 is shipped with the following items. If any of these items is missing or damaged, please contact your customer service representative for assistance.

- 1 AWK-3121
- 2 Swivel-type Antennas (2dBi, RP-SMA, 2.4&5GHz)
- 1 Quick Installation Guide
- 1 Software CD
- 1 Moxa Product Warranty Booklet
- 1 Cable Holder with a Screw
- 2 Protective Caps

Installation and Configuration

Before installing the AWK-3121, make sure that all items in the Package Checklist are in the box. In addition, you will need access to a notebook computer or PC equipped with an Ethernet port. The AWK-3121 has a default IP address that you must use when connecting to the device for the first time.

Step 1: Select the power source

The AWK-3121 can be powered by a DC power input or PoE (Power over Ethernet). The AWK-3121 will use whichever power source you choose.

Step 2: Connect the AWK-3121 to a notebook or PC

Since the AWK-3121 supports MDI/MDI-X auto-sensing, you can use either a straight-through cable or crossover cable to connect the AWK-3121 to a computer. If the LED indicator on the AWK-3121's LAN port lights up, it means the connection is established.

Step 3: Set up the computer's IP address

Set an IP address on the same subnet as the AWK-3121. Since the AWK-3121's default IP address is 192.168.127.253, and the subnet mask is 255.255.255.0, you should set the IP address of the computer to 192.168.127.xxx and subnet mask to 255.255.255.0.

Step 4: Use the web-based manager to configure AWK-3121

Open your computer's web browser and then type **http://192.168.127.253** in the address field to access the homepage of the web-based management. Before the homepage opens, you will need to enter the user name and password. For first-time configuration, enter the default user name and password and then click on the **Login** button:

User name: **admin**
Password: **root**

ATTENTION

For security reasons, we strongly recommend changing the password. To do so, select **Maintenance → Password**, and then follow the on-screen instructions.

Step 5: Select the operation mode for the AWK-3121

By default, the AWK-3121's operation mode is set to AP. You can change the setting in **Wireless Settings → Basic Wireless Settings** if you would like to use the Client mode.

NOTE To make the change effective, you must click Save Configuration to save the change or Restart (Save and Restart button to apply all changes.

Step 6: Test communications

We will describe two test methods. Use the first method if you are using only one AWK-3121, and use the second method if you are using two or more AWK-3121s.

Testing method for one AWK-3121

If you are only using one AWK-3121, you will need a second notebook computer (B) equipped with a WLAN card. Configure the WLAN card to connect to the AWK-3121 (the default SSID is **MOXA**) and change the IP address of notebook B so that it is on the same subnet as the first notebook (A), which is connected to the AWK-3121.

After configuring the WLAN card, establish a wireless connection with the AWK-3121 and open a DOS window on notebook B. At the prompt, type

ping IP address of notebook A

and then press the **Enter** key. A "Reply from IP address …" response means the communication was successful. A "Request timed out." response means the communication failed. In this case, recheck the configuration to make sure the connections are correct.

Testing method for two or more AWK-3121s

If you have two or more AWK-3121s, you will need a second notebook computer (B) equipped with an Ethernet port. Use the default settings for

the first AWK-3121 connected to notebook A, and change the second or third AWK-3121 connected to notebook B to Client mode and then configure the notebooks and AWK-3121s properly.

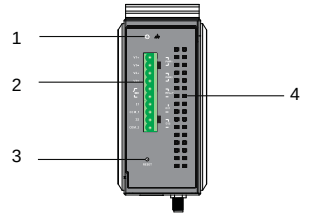
After setting up the testing environment, open a DOS window on notebook B. At the prompt, type

ping IP address of notebook A

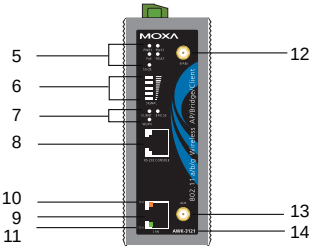
and then press **Enter** key. A "Reply from IP address …" response means the communication was successful. A "Request timed out." response means the communication failed. In this case, recheck the configuration to make sure the connections are correct.

Panel Layout of the AWK-3121

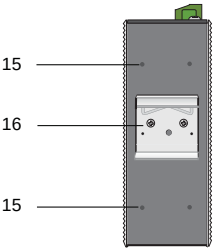
Top Panel View



Front Panel View

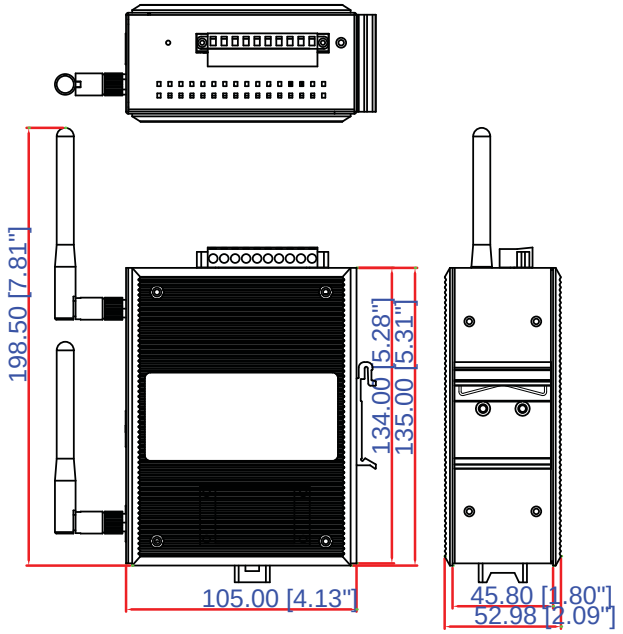


Rear Panel View



1. Grounding screw
2. Terminal block for PWR1, PWR2, relay, DI1, and DI2
3. Reset button
4. Heat dissipation orifices
5. System LEDs: PWR1, PWR2, PoE, FAULT, and STATE LEDs
6. LEDs for signal strength
7. WLAN LEDs: CLIENT BRIDGE, and WLAN LEDs
8. RS-232 console port
9. 10/100BaseT(X) RJ45 Port
10. 10M LED
11. 100M LED
12. MAIN antenna port
13. AUX antenna port
14. Model name
15. Screw hole for wall mounting kit
16. DIN-Rail mounting kit

Mounting Dimensions (unit = mm)

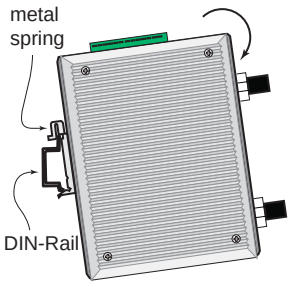


DIN-Rail Mounting

The aluminum DIN-Rail attachment plate should be fixed to the back panel of the AWK-3121 when you take it out of the box. If you need to reattach the DIN-Rail attachment plate to the AWK-3121, make sure the stiff metal spring is situated towards the top, as shown in the figures below.

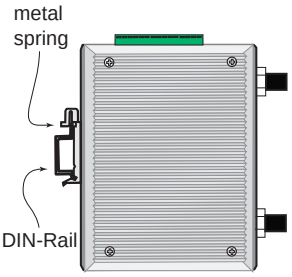
STEP 1:

Insert the top of the DIN-Rail into the slot just below the stiff metal spring.



STEP 2:

The DIN-Rail attachment unit will snap into place as shown below.

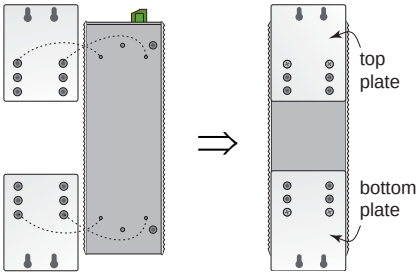


To remove the AWK-3121 from the DIN-Rail, simply reverse Steps 1 and 2.

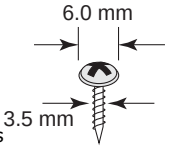
Wall Mounting (optional)

For some applications, it may be more convenient to mount the AWK-3121 to a wall, as illustrated below.

STEP 1:
Remove the aluminum DIN-Rail attachment plate from the AWK-3121, and then attach the wall mount plates with M3 screws, as shown in the adjacent diagrams.



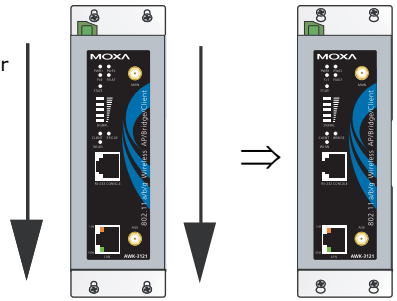
STEP 2:
Mounting the AWK-3121 to a wall requires 4 screws. Use the AWK-3121 device, with wall mount plates attached, as a guide to mark the correct locations of the 4 screws. The heads of the screws should be less than 6.0 mm in diameter, and the shafts should be less than 3.5 mm in diameter, as shown in the figure at the right.



Do not screw the screws in all the way—leave a space of about 2 mm to allow room for sliding the wall mount panel between the wall and the screws.

NOTE Test the screw head and shank size by inserting the screw into one of the keyhole shaped apertures of the Wall Mounting Plates before it is screwed into the wall.

STEP 3:
Once the screws are fixed into the wall, insert the four screw heads through the large opening of the keyhole-shaped apertures, and then slide the AWK-3121 downwards, as indicated to the right. Tighten the four screws for added stability.



Wiring Requirements

WARNING

Safety First!
Be sure to disconnect the power cord before installing and/or wiring your Moxa AWK-3121.

WARNING

Safety First!

Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowed for each wire size.
If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.

You should also pay attention to the following items:

- Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.
  NOTE: Do not run signal or communications wiring and power wiring in the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.
- You can use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring with similar electrical characteristics can be bundled together.
- Keep input wiring and output wiring separate.
- It is strongly advised that you label wiring to all devices in the system when necessary.

ATTENTION

This product is intended to be supplied by a Listed Power Unit marked "Class 2" or "LPS" and rated O/P: 12 to 48 VDC, minimum 6 W (12 V/0.494 A to 48V/0.121 A), 25°C.

ATTENTION

Make sure the external power adaptor (includes power cords and plug assemblies) provided with the unit is certified and suitable for use in your country.

Grounding the Moxa AWK-3121

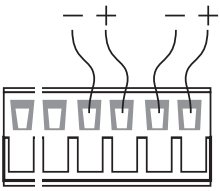
Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Run the ground connection from the ground screw to the grounding surface prior to connecting devices.

ATTENTION

This product is intended to be mounted to a well-grounded mounting surface, such as a metal panel.

Wiring the Redundant Power Inputs

The top two pairs of contacts of the 10-contact terminal block connector on the AWK-3121's top panel are used for the AWK-3121's two DC inputs. Top and front views of the terminal block connector is shown here.

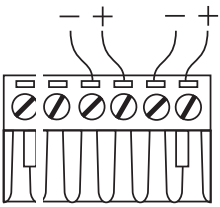


Top View

STEP 1: Insert the negative/positive DC wires into the V-/V+ terminals.

STEP 2: To keep the DC wires from pulling loose, use a small flat-blade screwdriver to tighten the wire-clamp screws on the front of the terminal block connector.

STEP 3: Insert the plastic terminal block connector prongs into the terminal block receptor, which is located on the AWK-3121's top panel.



Front View

ATTENTION

Before connecting the AWK-3121 to the DC power inputs, make sure the DC power source voltage is stable.

Wiring the Relay Contact

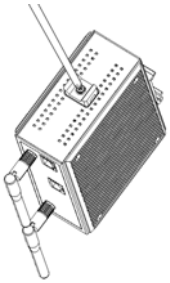
The AWK-3121 has one relay output, which consists of the two contacts of the terminal block on the AWK-3121's top panel. Refer to the previous section for detailed instructions on how to connect the wires to the terminal block connector, and how to attach the terminal block connector to the terminal block receptor. These relay contacts are used to indicate user-configured events. The two wires attached to the Relay contacts form an open circuit when a user-configured event is triggered. If a user-configured event does not occur, the Relay circuit will be closed.

Wiring the Digital Inputs

The AWK-3121 has two sets of digital input—DI1 and DI2. Each DI comprises two contacts of the 10-pin terminal block connector on the AWK-3121's top panel. You can refer to the "Wiring the Redundant Power Inputs" section for detailed instructions on how to connect the wires to the terminal block connector, and how to attach the terminal block connector to the terminal block receptor.

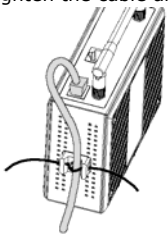
Cable Holder Installation (Optional)

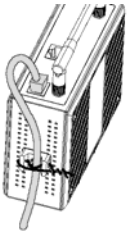
You can attach the cable holder to the bottom of the AWK-3121. This helps to keep cabling neat and avoid accidents that result from untidy cables.

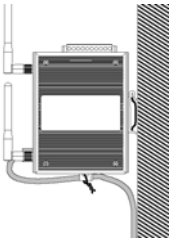


STEP 1: Screw the cable holder onto the bottom of the AWK-3121.

STEP 2: After mounting the AWK-3121 and plugging in the LAN cable, tighten the cable along the device and wall.





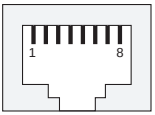


Communication Connections

10/100BaseT(X) Ethernet Port Connection

The 10/100BaseT(X) ports located on the AWK-3121's front panel are used to connect to Ethernet-enabled devices.

Below we show pinouts for both MDI (NIC-type) ports and MDI-X (HUB/Switch-type) ports.

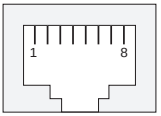
MDI Port Pinouts		MDI-X Port Pinouts		8-pin RJ45
Pin	**Signal**	**Pin**	**Signal**	
1	Tx+	1	Rx+	
2	Tx-	2	Rx-	
3	Rx+	3	Tx+	
6	Rx-	6	Tx-	

RS-232 Connection

The AWK-3121 has one RS-232 (8-pin RJ45) console port located on the front panel. Use either an RJ45-to-DB9 or RJ45-to-DB25 cable to connect the Moxa AWK-3121's console port to your PC's COM port. You may then use a console terminal program to access the AWK-3121 for console configuration.

Console Pinouts for 10-pin or 8-pin RJ45

10-Pin	Description	8-Pin
1	-----	
2	DSR	1
3	RTS	2
4	GND	3
5	TxD	4
6	RxD	5
7	DCD	6
8	CTS	7
9	DTR	8
10	-----	



NOTE
1. The pin numbers for male DB9 and DB25 connectors, and hole numbers for female DB9 and DB25 connectors are labeled on the connector. However, the numbers are typically quite small, so you may need to use a magnifying glass to see the numbers clearly.
2. The pin numbers for both 8-pin and 10-pin RJ45 connectors (and ports) are typically not labeled on the connector (or port). Refer to the Pinout diagram above to see how RJ45 pins are numbered.

ATEX Information

1. DEMKO certification number: 10 ATEX 0902666X
2. Ambient range (-40°C ≤ Tamb ≤ 75°C)
3. Certification string: Ex nA nL IIC T4
4. Standards covered (EN60079-0:2006, EN60079-15:2005)
5. The conditions of safe usage:
   a. The Ethernet Communication Devices are intended for mounting in an IP54 enclosure and used in an area of not more than pollution degree 2 as defined by IEC60664-1.
   b. Conductors suitable for use in an ambient temperature greater than 93°C must be used for the Power Supply Terminal.
   c. A 4 mm2 conductor must be used when connection to the external grounding screw is utilized.
   d. Cables must be suitable for use in an ambient temperature greater than 93°C.

LED Indicators

The front panel of the Moxa AWK-3121 contains several LED indicators. The function of each LED is described in the table below.

LED	Color	State	Description
Front Panel LED Indicators (System)			
PWR1	Green	On	Power is being supplied from power input 1.
		Off	Power is **not** being supplied from power input 1.
PWR2	Green	On	Power is being supplied from power input 2.
		Off	Power is **not** being supplied from power input 2.
PoE	Amber	On	Power is being supplied via PoE.
		Off	Power is **not** being supplied via PoE.
FAULT	Red	Blink (slow)	Cannot get an IP address from the DHCP server (interval: 1 sec)
		Blink (fast)	IP address conflict (interval: 0.5 sec)
		Off	Error condition does not exist.
STATE	Green/Red	Green	Software Ready
		Green Blink	The AWK has been located by AWK Search Utility. (interval: 1sec)
		Red	Booting error condition
SIGNAL (5 LEDs)	Green	On	Signal level (for **Client** mode only)
		Off	
BRIDGE MODE	Green	On	AWK functions in **Bridge** Mode.
		Off	AWK is not in **Bridge** Mode.
CLIENT MODE	Green	On	AWK functions in **Client** Mode.
		Off	AWK is not in **Client** Mode.
WLAN	Amber	On	WLAN is in used
		Off	WLAN is **not** in use

TP Port LED Indicators (Port Interface)			
100M	Green	On	TP port's 100Mbps link is **active.**
		Blink	Data is being transmitted at 100 Mbps
		Off	TP port's 100Mbps link is **inactive**.
10M	Yellow	On	TP port's 10Mbps link is **active**.
		Blink	Data is being transmitted at 10 Mbps
		Off	TP port's 10Mbps link is **inactive**.

Specifications

WLAN	
Standards	IEEE 802.11a/b/g for Wireless LAN IEEE 802.3u 10/100BaseT(X) for Ethernet LAN IEEE 802.3af for Power-over-Ethernet IEEE 802.1D/w STP/RSTP
Spread Spectrum and Modulation	DSSS with DBPSK, DQPSK, CCK OFDM with BPSK, QPSK, 16QAM, 64QAM
Operating Channels (Central Frequency)	US: 2.412 to 2.462 GHz (11 channels) 5.18 to 5.24 GHz (4 channels) EU: 2.412 to 2.472 GHz (13 channels) 5.18 to 5.24 GHz (4 channels) JP: 2.412 to 2.472 GHz (13 channels, OFDM) 2.412 to 2.484 GHz (14 channels, DSSS) 5.18 to 5.24 GHz (4 channels for W52)
Security	64-bit and 128-bit WEP encryption, WPA /WPA2 (IEEE 802.1X/ RADIUS, TKIP and AES)
Transmission Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
Protocol	
General Protocols:	Proxy ARP, DNS, HTTP, HTTPS, IP, ICMP, SNTP, TCP, UDP, RADIUS, SNMP, RTP
AP-only Protocols:	ARP, BOOTP, DHCP, STP/RSTP (IEEE 802.1D/w)
TX Transmit Power (for hardware revision 1.2)	
802.11b:	Typ. 23±1.5 dBm @ 1 to 11 Mbps
802.11g:	Typ. 20±1.5 dBm @ 6 to 24 Mbps, Typ. 19±1.5 dBm @ 36 Mbps, Typ. 18±1.5 dBm @ 48 Mbps, Typ. 17±1.5 dBm @ 54 Mbps
802.11a:	Typ. 18±1.5 dBm @ 6 to 24 Mbps, Typ. 16±1.5 dBm @ 36 to 48 Mbps, Typ. 15±1.5 dBm @ 54 Mbps
RX Sensitivity (for hardware revision 1.2):	
802.11b:	-97 dBm @ 1 Mbps, -94 dBm @ 2 Mbps, -92 dBm @ 5.5 Mbps, -90 dBm @ 11 Mbps
802.11g:	-93 dBm @ 6 Mbps, -91 dBm @ 9 Mbps, -90 dBm @ 12 Mbps, -88 dBm @ 18 Mbps, -84 dBm @ 24 Mbps, -80 dBm @ 36 Mbps, -76 dBm @ 48 Mbps, -74 dBm @ 54 Mbps
802.11a:	-90 dBm @ 6 Mbps, -89 dBm @ 9 Mbps, -89 dBm @ 12 Mbps, -85 dBm @ 18 Mbps, -83 dBm @ 24 Mbps, -79 dBm @ 36 Mbps, -75 dBm @ 48 Mbps, -74 dBm @ 54 Mbps
TX Transmit Power (for hardware revision 1.0 and 1.1)	
802.11b:	Typ. 18±1.5 dBm @ 1 to 11 Mbps
802.11g:	Typ. 18±1.5 dBm @ 6 to 24 Mbps, Typ. 16±1.5 dBm @ 36 to 48 Mbps, Typ. 15±1.5 dBm @ 54 Mbps
802.11a:	Typ. 16±1.5 dBm @ 6 to 24 Mbps, Typ. 14±1.5 dBm @ 36 to 48 Mbps, Typ. 13±1.5 dBm @ 54 Mbps

RX Sensitivity (for hardware revision 1.0 and 1.1):	
802.11b:	-92 dBm @ 1 Mbps, -90 dBm @ 2 Mbps, -88 dBm @ 5.5 Mbps, -84 dBm @ 11 Mbps
802.11g:	-87 dBm @ 6 Mbps, -86 dBm @ 9 Mbps, -85 dBm @ 12 Mbps, -82 dBm @ 18 Mbps, -80 dBm @ 24 Mbps, -76 dBm @ 36 Mbps, -72 dBm @ 48 Mbps, -70 dBm @ 54 Mbps
802.11a:	-87 dBm @ 6 Mbps, -86 dBm @ 9 Mbps, -85 dBm @ 12 Mbps, -82 dBm @ 18 Mbps, -80 dBm @ 24 Mbps, -76 dBm @ 36 Mbps, -72 dBm @ 48 Mbps, -70 dBm @ 54 Mbps
Interface	
Default Antenna	2dBi dual-band, Omni-directional antenna
Antenna Connector	RP-SMA (female)
Connection	10-pin Removable Terminal Block
Alarm Contact	1 relay output (capacity: 1A @24VDC)
Digital Input	2 electrically-isolated inputs • 3 to -30V for state "0" (OFF) • 13 to 30V for state "1" (ON) • Max. input current: 8 mA
Console	RS-232 (RJ45 type)
LAN Port	10/100BaseT(X) auto negotiation speed
LED Indicators	PWR1, PWR2, PoE, FAULT, STATE, Signal Strength, CLIENT, MODE, BRIDGE MODE, WLAN, 10M, 100M
Power	
Input Voltage	12 to 48 VDC, redundant dual DC power inputs or 48 VDC Power-over-Ethernet (IEEE 802.3af)
Input Current	0.494A-0.121A (@ 12-48VDC) 0.3A @24 VDC
Reverse Polarity Protection	Present
Mechanical	
Casing	IP30 protection, aluminum case
Dimensions	53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)
Weight	850g
Installation	DIN-Rail, or wall mounting
Environmental	
Operating Temperature	Standard models: 0 to 60°C (32 to 140°F) Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature	-40 to 85ºC (-40 to 185ºF)
Ambient Relative Humidity	5 to 95% (non-condensing)
Regulatory Approvals*	
Radio	EN300 328
EMC	EN301 489-1/-17
EMI	FCC Part 15
* Please check Moxa's website for the most up-to-date certification status.	
WARRANTY	5 years Details: See http://www.moxa.com/warranty

ATTENTION

The AWK-3121 is **NOT** a portable mobile device and should be located at least 20 cm away from the human body.
The AWK-3121 is **NOT** designed for the general public. To deploy AWK-3121s and establish a wireless network safely, a well-trained technician is required for installation.

ATTENTION

Use the antennas correctly: The 2.4 GHz antennas are needed when the AWK-3121 operates in IEEE 802.11b/g. The 5 GHz antennas are needed for IEEE802.11a. Make sure your antenna installation is within a safety area, which is covered by a lightning protection or surge arrest system.

Technical Support Contact Information
www.moxa.com/support

Moxa Americas:
Toll-free: 1-888-669-2872
Tel: 1-714-528-6777
Fax: 1-714-528-6778

Moxa China (Shanghai office):
Toll-free: 800-820-5036
Tel: +86-21-5258-9955
Fax: +86-21-5258-5505

Moxa Europe:
Tel: +49-89-3 70 03 99-0
Fax: +49-89-3 70 03 99-99

Moxa Asia-Pacific:
Tel: +886-2-8919-1230
Fax: +886-2-8919-1231